EXECUTIVE SUMMARY

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The Bureau of Land Management (BLM) is proposing to amend the 1998 *Northeast Integrated Activity Plan/Environmental Impact Statement* (1998 Northeast IAP/EIS) and subsequent Record of Decision (ROD) to consider opening portions of the BLM-administered lands that are currently unavailable or under a No Surface Activity restriction for oil and gas leasing in the Northeast National Petroleum Reserve – Alaska (Planning Area). In addition, the BLM proposes to consider developing performance-based lease stipulations and Required Operating Procedures (ROPs) in the Planning Area similar to the stipulations and ROPs included in the *Northwest National Petroleum Reserve – Alaska IAP/EIS Record of Decision* (Northwest IAP/EIS ROD). The BLM believes that performance-based lease stipulations and ROPs would provide the agency greater flexibility in safeguarding important surface resources from the impacts of oil and gas activities.

In amending the 1998 Northeast IAP/EIS, the BLM comports with the recommendation of the President's National Energy Policy Development Group that the President direct the Secretary of the Interior to "consider additional environmentally responsible oil and gas development, based on sound science and the best available technology, through further lease sales in the National Petroleum Reserve – Alaska." The recommendation further states that "such consideration should ***include areas not currently leased within the northeast corner of the National Petroleum Reserve – Alaska***" (bold added). Congress, in a 1981 amendment to the Naval Petroleum Reserves Production Act (NPRPA; 42 USC § 6508), also directed the BLM to undertake an expeditious program of competitive leasing of oil and gas in the National Petroleum Reserve - Alaska, including the Planning Area. Executive Order 13212 directs "executive departments and agencies (agencies) shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy."

> ***The energy resources of the National Petroleum Reserve-Alaska are essential to meeting our nation's energy demands, will enhance domestic energy production, and decrease our nation's dependency on foreign oil sources.***

North Slope oil production, centered at the massive Prudhoe Bay field, is key to meeting the nation's domestic oil supply. The North Slope contributes about 16 percent of America's current domestic production. The oil industry has discovered and developed other fields both to the east and west of Prudhoe Bay. However, production is in decline from these older fields, and there are indications that the Planning Area contains oil and natural resources that could help to stem the decline.

To carry out its management responsibilities and respond to the nation's energy needs and the President's National Energy Policy, the BLM is proposing to amend its 1998 Northeast IAP/EIS to:

- Consider leasing portions of lands currently closed or under a No Surface Activity restrictions to oil and gas leasing in the Northeast National Petroleum Reserve - Alaska; and
- Consider developing performance-based lease stipulations and ROPs to provide the BLM greater flexibility in protecting important surface resources from the impacts of oil and gas activities, similar to those developed for the Northwest National Petroleum Reserve – Alaska.

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> - ***Consider developing performance-based lease stipulations and ROPs to provide the BLM greater flexibility in protecting important surface resources from the impacts of oil and gas activities, similar to those developed for the Northwest National Petroleum Reserve – Alaska.***

Subsistence activities in the Planning Area, particularly hunting and fishing, are important to local residents, including the Iñupiat, the Native people of Alaska's North Slope. Subsistence hunting and fishing are central to the Iñupiat's ages-old cultural system. Moreover, subsistence activities provide critical sustenance for people who live off Alaska's road network at an extreme distance from the nation's food-distribution system.

Several portions of the Planning Area have particularly important surface values. The Teshekpuk Lake Special Area (TLSA), created in 1976, in the northern third of the Planning Area, was designated to protect caribou and waterfowl habitat; it also is the area with the highest potential for oil and gas resources. The Colville River Special Area (CRSA), in the southernmost part of the Planning Area, provides habitat for raptors, moose, and fish. In addition, the CRSA contains world-class paleontological deposits. Provisions in the NPRPA required that any oil and gas exploration or development within a special area "shall be conducted in a manner which will assure the maximum protection of such surface resources to the extent consistent with the requirements of the Act for the exploration of the reserve." The NPRPA further states that oil and gas activities are subject to "conditions, restrictions or prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable and significant adverse effects on surface resources in the National Petroleum Reserve - Alaska" (42 USC § 6508).

Performance-Based Lease Stipulations and ROPs

- ***Performance-based lease stipulations and ROPs would afford the BLM increased flexibility to allow for improved and timely resource mitigation. They are driven by an objective; for example, "minimize disruption of caribou movement and subsistence use." The activities on the ground must meet this objective. The also identify current accepted standards such as "all pipelines must be a minimum of 7 feet as measured from the ground to the bottom of the pipeline." Under the No Action Alternative, the current prescriptive stipulations provide for an elevation of 5 feet, a standard that does not always effectively allow for caribou movement.***
- ***Performance-based lease stipulations and ROPs would allow the BLM to implement adaptive management principles, recognizing that knowledge about natural resource systems is sometimes uncertain and changing. The ability to adapt management decisions would allow the BLM to meet resource management objectives, outcomes, and goals identified during the environmental analysis.***
- ***Making the Amended IAP/EIS lease stipulations and ROPs consistent with those developed in the Northwest IAP/EIS (performance-based) would allow future Planning Area lessees to work from the same standards and rules, and allow them to focus on exploration and development methods to meet the desired resource objectives, outcomes, and goals for all of the northern section of the National Petroleum Reserve – Alaska. (Note: Any newly-developed and adopted lease stipulations and ROPs would not apply to current lessees. Any changes to the current 1998 ROD lease stipulations would be accomplished through negotiations with current lessees and additional NEPA actions.)***

This amendment analyzes a No Action Alternative and three other action alternatives. All three action alternatives would make additional areas of the Planning Area available for oil and gas leasing, and adopt performance-based lease stipulations and ROPs, in a manner consistent with responsible protection of other important surface resources. These alternatives present a range of actions that the BLM could take to achieve these objectives, consistent with statutory direction for management of the National Petroleum Reserve – Alaska.

Each alternative includes mitigation measures that broadly apply to the Planning Area. For example, stipulations and ROPs address: waste prevention, handling, and disposal; spill prevention and response; potential impacts of oil and gas exploration and development; protection of subsistence activities; protection of vegetation, fish, wildlife, cultural, and paleontological resources; and protection of endangered and threatened species.

The alternatives presented in this amendment are consistent with the purposes of the National Petroleum Reserve – Alaska's governing statutes. Each alternative offers a different balance between serving the "total energy needs of the nation," a goal of the NPRPA, while protecting surface resources from "unnecessary and undue degradation," as required by the Federal Land Policy and Management Act; providing maximum protection of surface resources in special areas to the extent consistent with the goals of the NPRPA; and providing conditions, restrictions or

prohibitions to mitigate significant adverse effects on surface resources as required by the NPRPA. See Table 2-1 in Chapter 2 (Alternatives) for a comparison of these alternatives. The alternatives are described below:

Alternative A (No Action Alternative). Alternative A is comprised of decisions established in the ROD for the 1998 Northeast IAP/EIS. The decisions described in this alternative constitute the existing management practices of the Northeast National Petroleum Reserve - Alaska.

Under this alternative, management practices would emphasize prescriptive-based restrictions on surface activities, consultation with local residents, and coordinated scientific studies to protect wildlife habitat, subsistence use areas, and other resources. At the same time, approximately 87 percent (4 million acres) of the Planning Area's 4.6 million acres would be available for oil and gas leasing (Map 2-1). The prescriptive-based stipulations developed for this alternative in the 1998 Northeast IAP/EIS ROD are listed in Appendix E. Appendix F (Standardized Stipulations Applied to Mitigate the Impacts of Non-Oil and Gas Authorizations) lists stipulations that apply to all non-oil and gas-related activities in the Planning Area.

- ***Although 87 percent of the Planning Area is currently available to oil and gas leasing, 56% of the high potential area is off limits or encumbered by no-surface activity restrictions.***
- ***The portions of the Planning Area currently unavailable for exploration and development may contain 1.9+ billion barrels of economically-recoverable oil and 3.5 trillion cubic feet of gas.***

Alternative B. Alternative B utilizes performance-based lease stipulations and ROPs. Approximately 95 percent (~4.4 million acres) of the Planning Area's 4.6 million acres would be available for oil and gas leasing. Approximately 213,000 acres north of Teshekpuk Lake would be unavailable for leasing to provide protection for fish and wildlife habitat and subsistence uses, while providing access to new oil and gas resources on approximately 387,000 acres currently unavailable for leasing (Map 2-2). Performance-based lease stipulations and ROPs (patterned after those developed for the Northwest portion of the National Petroleum Reserve – Alaska) would be used to mitigate the impacts of energy development, and other land uses, on other resources. Lease stipulations and ROPs would provide clearly defined setbacks, restrictions (including seasonal restrictions), and guidance for all aspects of oil and gas-related operations. These measures would provide protection for important natural resources, including water quality, vegetation, wetlands, fish and wildlife habitat (including habitat for threatened and endangered species), cultural and paleontological resources, subsistence uses and access, and scenic and recreation values. Additional seasonal and spatial stipulations would provide maximum protection of environmentally sensitive areas, including Special Areas. These areas, which are described in Section 2.2.1 (Areas with Additional Stipulations) and in the stipulations outlined in Section 2.6 (Stipulations and Required Operating Procedures), include:

To foster a Nation of citizen stewards, Secretary of the Interior Gale Norton is advancing a 4 C's philosophy—conservation through communication, consultation and cooperation that begins at the grassroots level. In developing the final Preferred Alternative, the BLM has consulted continually with the communities in the area. A concerted effort was, and continues to be made, to closely coordinate with the U. S. Fish and Wildlife Service as well as other stakeholders to develop appropriate protections for migratory waterfowl that depend on the area.

- Rivers Area
- Deep Water Lakes
- Teshekpuk Lake
- Goose Molting Area
- Teshekpuk Lake Caribou Habitat Area
- Coastal Area
- Colville River Special Area
- Pik Dunes

Alternative C. Alternative C would utilize the same performance-based stipulations and ROPs developed for Alternative B and are intended to mitigate the impacts of energy development and other land uses on resources in

the Planning Area. All of the Planning Area would be available for leasing; however, seasonal and spatial stipulations would be applied to protect environmentally sensitive areas (Map 2-3). These areas are described in Section 2.2.1 (Areas with Additional Protections) and in the stipulations outlined in Section 2.6 (Stipulations and Required Operating Procedures), and are the same as those identified above for Alternative B.

Alternative D (Final Preferred Alternative). Alternative D, the final Preferred Alternative, utilizes performance-based stipulations and ROPs. Approximately 95 percent (~4.4 million acres) of the Planning Area's 4.6 million acres would be available for oil and gas leasing. Under Alternative D, Teshekpuk Lake (approximately 211,000 acres) would be deferred from leasing. This deferral would provide protection for fish and wildlife habitat and subsistence uses, while providing access to new oil and gas resources on approximately 389,000 acres (Map 2-4). Alternative D would utilize similar performance-based stipulations and ROPs developed for Alternative B intended to mitigate the impacts of energy development and other land uses on resources in the Planning Area. Seasonal and spatial stipulations would be applied to protect environmentally sensitive areas. These areas are described in Section 2.2.1 (Areas with Additional Protections) and in the stipulations outlined in Section 2.6 (Stipulations and Required Operating Procedures), and are similar to those identified above for Alternative B. In addition, no permanent oil and gas facilities, excluding pipelines, would be allowed on approximately 217,000 acres associated with goose molting lakes to the north of Teshekpuk Lake, with no exceptions allowed. In addition, the area north of Teshekpuk Lake has been divided into seven lease tracts, ranging in size from 45,950 to 57,960 acres. No more than 300 acres of surface disturbance would be allowed in each lease tract. No permanent oil and gas facilities, including pipelines and publicly-funded community roads, east of Teshekpuk Lake and west of the Kogru Inlet, would be allowed on approximately 16,000 acres. Finally, no permanent oil and gas facilities would be allowed on approximately 141,000 acres south/southeast of Teshekpuk Lake, excluding pipelines and publicly-funded community roads.

Additional Protective Measures Included in the Final Preferred Alternative D

- ***All deep-water lakes south of Teshekpuk Lake would have a ¼ mile buffer that is protected from permanent oil and gas activities.***
- ***All water intake structures in fish-bearing or non-fish-bearing waters would be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury.***
- ***The 1998 Northeast IAP/EIS subsistence consultation buffer has been expanded to include the entire Planning Area, not just portions of several buffers along various rivers as is the case in the 1998 Northeast IAP/EIS ROD.***
- ***The minimum required height of any new pipeline constructed is 7 feet as measured from the ground to the bottom of the pipeline at vertical support members; the current requirement is 5 feet.***
- ***All river setbacks (with the exception of the Ikpikpuk River) have been maintained as they were developed for the 1998 Northeast IAP/EIS ROD. The 3-mile setback on Fish Creek would continue to be off-limits to permanent oil and gas surface facilities.***
- ***The Tingmiaksiqvik River (Ublutuoch River) has been added to the list of rivers with set-backs that provide additional fish protection.***
- ***Activities along Coastal Areas include consultation requirements with the Nuiqsut Whaling Captains Association, Alaska Eskimo Whaling Commission, the Barrow Whaling Captains Association, and North Slope Borough to minimize impacts to subsistence whaling activities.***
- ***A Caribou Movement Corridor would be established to minimize disturbance and hindrance of caribou, or alteration of caribou movements (that are essential for all season use, including calving and rearing, insect relief, and migration) in the area extending eastward for 4 miles from the eastern shore of Teshekpuk Lake toward the Kogru Inlet.***
- ***A Southern Caribou Calving Area would be established to minimize disturbance and hindrance of caribou, or alteration of caribou movements (that are essential for all season use, including calving and post calving, and insect relief) in the area south/southeast of Teshekpuk Lake.***
- ***7 Lease Tracts with surface occupancy restrictions would be identified to limit surface disturbance in the Goose Molting Area (north of Teshekpuk Lake), providing protection to key surface resources and subsistence resources from permanent oil and gas development and associated activities.***

Summary of Impacts. The analyses of oil exploration and development scenarios for each alternative, and the potential impacts from actions taken under each alternative, are in Chapter 4 (Environmental Consequences). The analyses assume that the stipulations identified in Appendix E for the No Action Alternative, or the lease stipulations and ROPs identified in Section 2.6 (Stipulations and Required Operating Procedures) for the final Preferred Alternative D, and alternatives B and C, would be adopted under each alternative. The analyses also assume compliance with existing laws and regulations. The impacts of each alternative are summarized below. A comparison of the overall impacts of each alternative is presented in Table 2-3 in Chapter 2.

It is possible to develop oil resources identified as unavailable under the 1998 Northeast IAP/EIS while protecting important biological and subsistence resources using performance-based stipulations and ROPs. It is estimated that the final Preferred Alternative would provide an estimated 1.7+ billion barrels of economically recoverable oil potential at an average oil price of $30, as opposed to an estimated 600 million barrels under the No Action Alternative as discussed in the 1998 Northeast IAP/EIS ROD.

Impacts would be of several general types. Except for overland moves, non-oil and gas activities would generally occur during the summer, and be of short duration (e.g., aircraft flight or landing) and localized (e.g., a research or recreational camp). These activities would be unlikely to have more than short-term and localized impacts. Seismic activities, overland moves, and exploratory drilling would all occur during the winter when the ground is frozen and snow-covered and many species have migrated out of the area. These activities could briefly impact the species that remain through the winter. Their effects could linger into the following summer or longer, in the form of varied impacts to vegetation and soils, and ranging from the compression of standing dead vegetation to crushed tussocks and dead or broken shrubs.

During the fall and winter harvest seasons, subsistence resources are available well beyond the coastal areas and rivers that are accessible during the summer. Winter allows subsistence hunters access to an expanded harvest area, which could potentially lead to greater frequency of industry/hunter contact and consequent disruption of harvest activities. Winter is also a time when wildlife are exposed to natural environmental stresses: limited forage, severe cold, high winds, and compacted snow cover. The effects of seismic surveying activities on subsistence resources (as well as on the harvest of these resources) could be more pronounced during winter.

The greatest impacts would be associated with oil and gas development. Placement of gravel drilling pads, roads, airstrips, and staging areas, and the activities that take place on them, as well as construction of oil and gas pipelines, would permanently disturb or destroy soil and vegetation; impound and disturb water; disturb, displace, or kill fish and wildlife; risk disturbing or destroying paleontological and cultural (archaeological and historic) resources; and potentially affect subsistence (by affecting species or impeding user access) and recreation. The impacts from developing and using these facilities would vary by resource. Because the land likely to be disturbed is a very small percentage of the 4.6 million surface acres the BLM manages in the Planning Area, impacts to soil, vegetation, water, and paleontological and cultural resources would be minor. Impacts to fish, wildlife, subsistence, and recreation extend beyond the immediate vicinity of the disturbed ground and, depending on location and protective measures used, could be out of proportion with a development's small footprint. If a development were to lead to a crude oil or refined fuel spill, particularly one that extended beyond a drilling pad, impacts could be greater.

Alternative C will have the greatest impact, primarily because it would likely lead to the most seismic surveys, exploratory drilling, and development of oil. Under this alternative, 4.6 million acres of the Planning Area would be open to leasing, although stipulations and ROPs would place restrictions on where surface impacts could occur. In most instances, impacts would be minor. The footprint would be unlikely to directly impact more than 2,000 acres of soil or vegetation. Individual fish, mammals, and birds would probably die or be displaced, but it is likely that few or no populations would be measurably affected. Impacts to subsistence and recreation generally would not exceed minor levels. Three potential occurrences could increase the level of impact to some resources under Alternative C. One is oil field development in the caribou insect-relief areas and core calving grounds to the south, east, and north of Teshekpuk Lake, which are used by the Teshekpuk Lake Herd caribou and are currently protected as no-lease or no-surface-occupancy areas. Development in these areas could interfere with caribou

movements and have some reproductive consequences, which could in turn impact subsistence hunters and those dependent on them. Secondly, development in the Goose Molting Area could interfere with waterfowl breeding, brood-rearing, and molting activities. Thirdly, an oil spill could cause moderate or greater impacts if the spill were to occur in or enter a river delta or nearshore area occupied by waterfowl. If development activities were to have effects on a rare or vulnerable species, moderate or severe impacts could result. Certain vulnerable bird species (those with declining or small or sensitive populations, such as the threatened spectacled eider), could be moderately impacted if development occurred where a species was concentrated. Rare plants could be impacted severely if development overlapped the area in which such plants exist.

Alternative B would have less impact than Alternative C. Approximately 213,000 acres to the north of Teshekpuk Lake would be unavailable for leasing. This area is an important goose molting area, and is also an important travel corridor for caribou moving between wintering and breeding/insect-relief grounds. For the remaining portion of the Planning Area, impacts that could result from oil and gas exploration and development under Alternative C would also apply to this alternative. The performance-based ROPs and stipulations developed for Alternative C would also apply to the Alternative B.

- ***A 217,000 acre area that is important use habitat for molting geese and other waterfowl will be deferred from leasing under the final Preferred Alternative D. In addition to providing secure habitat for birds, this area provides important habitat for caribou to use as insect-relief habitat.***

The **final Preferred Alternative D** would have less impact than Alternative C and would provide a similar level of protection as Alternative B in terms of large surface restrictions and/or land deferrals. Teshekpuk Lake (211,000 acres) would be deferred from leasing. Similar performance-based lease stipulations and ROPs developed for Alternative B would be applied to the final Preferred Alternative, which are intended to mitigate the impacts of energy development and other land uses on resources in the Planning Area. Seasonal and spatial stipulations would be applied to protect environmentally sensitive areas. These areas are described in Section 2.2.1 (Areas with Additional Protections) and in the stipulations outlined in Section 2.6 (Stipulations and Required Operating Procedures), and are similar to those identified above for Alternative B. As described above, no permanent oil and gas facilities, excluding pipelines, would be allowed on approximately 217,000 acres north of Teshekpuk Lake, with no exceptions allowed. No permanent oil and gas facilities, including pipelines and publicly-funded community roads, would be allowed on approximately 16,000 acres east of Teshekpuk Lake and west of the Kogru Inlet. No permanent oil and gas facilities, excluding pipelines and publicly-funded community roads, would be allowed on approximately 141,000 acres south/southeast of Teshekpuk Lake. In addition, the area north of Teshekpuk Lake would be divided into seven lease tracts ranging in size from approximately 45,950 to 57,960 acres (approximately 374,000 total acres). Surface disturbance would be limited to no more than 300 acres within each of the lease tracts north of Teshekpuk Lake.

Teshekpuk Lake provides habitat for a variety of fish and wildlife, and the protected areas near Teshekpuk Lake provide important goose molting habitat, and calving, post-calving, insect-relief, and migration habitat for caribou. For the remaining portion of the Planning Area, impacts that could result from oil and gas exploration and development under Alternative B would also apply to this alternative.

Alternative A, the No Action Alternative, would have the least impact of the four alternatives due mainly to approximately 600,000 acres remaining off-limits to future leasing and development, as well as the continued No Surface Activity stipulation south of Teshekpuk Lake affecting approximately 240,000 acres. The area unavailable for leasing is centered around Teshekpuk Lake and includes important habitat for caribou, waterfowl, and other wildlife. It is also an important area for subsistence uses. The stipulations that were developed under the 1998 Northeast IAP/EIS ROD are prescriptive in nature, and while providing similar levels of protection to the resources within the Planning Area, they do not allow for modification or change when new information becomes available, either through monitoring, scientific studies, or new technological advances. The BLM believes that performance-based stipulation and ROPs and the greater flexibility they offer to adapt requirements/standards to specific situations and to modify the requirements/standards if they prove ineffective, not only are adequate, but would increase the agencies ability to protect surface resources and subsistence use.

In addition to the potential effects of actions in the Planning Area, the cumulative analysis includes the potential effects of activities elsewhere that may affect the important resources of the Northeast National Petroleum Reserve - Alaska and surrounding areas. The conclusions of the cumulative analyses are summarized below.

Cumulative Impacts. Cumulative impacts from proposed activities in the Planning Area to air quality, paleontological resources, soils, water resources, water quality, fish and wildlife, endangered and threatened species, subsistence resources, recreation and wild and scenic river values, visual resources, and the economy are expected to be minimal on the North Slope, but could persist long term (approximately 10 years). Although non-oil and gas (e.g., DEW-line sites, villages, remote airstrips, and recreation), and oil and gas activities have directly impacted over 20,000 acres since the early 1900s, many of the impacts have lessened or have recovered over time through natural processes or reclamation.

Non-oil and gas activities, such as commercial and subsistence hunting, development within Native villages, and industrial activity in Europe and Asia have impacted resources on the North Slope in the past, and will continue to do so in the future. Air pollutants associated with industrial activities in Europe and Asia are believed responsible for causing Artic haze on the North Slope. Development of military facilities and villages has disturbed several thousand acres of soil, water, vegetation resources, and fish and wildlife habitat, and these effects that will persist indefinitely. Much of this development has occurred along the coastline, an area that provides important habitat for caribou seeking insect-relief, and for nesting and molting waterfowl. As a result of commercial whaling impacting bowhead whale and other whale stocks a century ago, limits are placed on the number of whales that can be harvest today by Native peoples of the North Slope. Subsistence harvests cause the loss of small numbers of waterfowl, caribou, and whales today, but populations of most subsistence species are healthy. Subsistence hunting, through direct take of animals, or indirectly from lead poisoning resulting from use of lead shot, could also result in small losses or declines in the productivity of spectacled or Steller's eiders, species federally-listed as threatened. Recreation and scientific survey activities have only minor cumulative impacts on North Slope resources.

Oil and gas activities have had substantial impacts on natural and social resources of the North Slope. Oil and gas facilities emit air pollutants, but air quality is good on the North Slope and is projected to improve as the amount of oil and gas production on the North Slope declines from historic levels and newer air emissions control technologies are used. Over 17,000 acres of surface disturbance has affected soil, paleontological, cultural, water, vegetation, and fish and wildlife habitat resources on the North Slope. Much of this disturbance occurred before the 1970s, and some has repaired itself through natural processes or through reclamation, but most effects of disturbance will persist for many decades. Some disturbed areas, such as gravel mine pits, now provide important overwintering habitat for fish.

A major concern associated with oil and gas displacement is the long-term displacement and functional loss of habitat for the Central Arctic Herd (CAH), Teshekpuk Lake Herd (TLH), and Western Arctic Herd (WAH) of caribou. Oil development in the Prudhoe Bay-Kuparuk area could be a cause of an observed shift in CAH calving distribution away from its calving range near the oil fields. Calving by TLH caribou could be reduced near the pipeline corridors, which would have a potential long-term (several-generation) effect on the distribution of the TLH caribou.

Oil and gas facilities not only displace caribou and other wildlife, but subsistence hunters also tend to avoid hunting near these facilities, and must travel further in search of fish and game than in the past. The communities of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut would be most affected; the community of Wainwright could also be affected, since the majority of the caribou it harvests are from the TLH caribou. Caribou could become unavailable, undesirable for use, or experience long-term population and productivity effects for a period longer than 5 years. These effects may disrupt sociocultural systems in the communities that are reliant on caribou for subsistence. Subsistence users could also be displaced even if the availability and distribution of subsistence resources did not change substantially. For example, Nuiqsut subsistence hunters no longer hunt in traditional areas where oil-field infrastructure now exists, even though subsistence resources continue to be available. Effects would be expected to disrupt community activities and traditional practices for harvesting, sharing, and processing

subsistence resources, but would not displace sociocultural institutions, social organization, or sociocultural systems.

Of particular concern to Native peoples is the risk of a major oil spill that could harm the land and subsistence resources. Although past spills have been small and have caused little harm, there is concern that a larger spill could occur in the future.

Residents of the North Slope have benefited from the income and jobs provided by the oil and gas industry. The economy for many villagers is a "mixed-economy," where residents are employed in jobs, but also continue their traditional subsistence ways. Income from jobs allows residents to buy snowmachines, boats, and other equipment to aid in subsistence hunting, but time spent working at a traditional job takes time away from subsistence activities. Over the next 20 to 30 years, the onshore and offshore oil industry in and near Prudhoe Bay is expected to decline, with a parallel decline in the economic indicators within the North Slope region. If oil production declines in the future, as predicted, and a natural gas line is not built to the North Slope to provide a new source of revenue, employment opportunities and income for residents, and the ability of the North Slope Borough to support and maintain the existing infrastructure, will decline.

Global climate change could alter the composition of vegetation species, increasing deciduous shrubs and decreasing sedges and grasses, and lead to higher rates of coastal erosion. Activities in the Planning Area are not expected to contribute substantially to greenhouse gas emissions, however, as burning of fossil fuels produced in the Planning Area would contribute less than 0.2 percent to annual greenhouse gas emissions based on estimates of future oil and gas production in the Planning Area. However, the effects of global climate change could exceed those effects to natural and social resources from man-induced activities on the North Slope.

New oil and gas exploration and development technologies developed during the past 30 years should ensure that future impacts from oil and gas exploration and development are less than has occurred historically for the same level of development. For example, use of ice roads and pads during exploration, and directional drilling during development, have reduced the amount of gravel that must be placed upon the tundra, and mined, to support oil and gas activities. Stipulations and ROPs developed for the 1998 Northeast IAP/EIS and this amendment would also reduce the effects of non-oil and gas, and oil and gas, activities on the North Slope. Still, as development continues to expand into new areas, effects to natural and social resources would increase and accumulate with past effects.